and

3) Under Agenda Item 8.2 to propose a WRC-16 Agenda item and an accompanying Resolution [CGC Agenda (WRC-12)] "to consider adopting regulatory, technical and allocation provisions in the Radio Regulations to enable the Complementary Ground Component ("CGC") of a mobile-satellite service (MSS) system to operate on a co- primary basis with the MSS allocation in the bands 1525-1544, 1545 -1559 MHz., 1626.5- 1645.5 MHz and 1646.5- 1660.5 MHz.

The three proposals build upon one another and, thus, are interdependent as described below.
The Mod Recommendation 206 proposal defines, on an interim basis, MSS in the bands 1525-1544 MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.5-1660.5 MHz as including CGC within Integrated MSS System networks. This will recognize that CGC is operating in the bands with the MSS links of the host Integrated MSS System. It urges administrations to include CGC in their MSS satellite coordination discussions

The Resolution [CGC. Notify] proposal creates a mechanism for the CGC networks being implemented by the notifying administration of the Integrated MSS System network and other Administrations implementing CGC to associate the CGC networks with the Integrated MSS network. It provides interim procedures, prior to action at WRC-16, that would permit the notifying administration to inform the ITU – BR and other administrations that the notified MSS network is an Integrated MSS System network, and to confirm that associated CGC networks that may be implemented by other administrations would operate within the parameters of the notified Integrated MSS System network. Resolution [CGC.Notfy] would be made applicable only to the MSS in the 1525-1544MHz and 1555- 1559 MHZ and 1626.5 -1645.5 MHz and 1646.5-1660.5 MHz bands

Finally, the third proposal is for a WRC-16 Agenda item with an attendant Resolution [CGC.Agenda (WRC-12)] that addresses all of the regulatory, technical and operational issues that are to be studied in the intervening period between WRC-12 and WRC-16 for WRC-16 consideration in addressing the appropriate allocation mechanism and structure to support CGC networks operating in an Integrated MSS network on a primary basis.

The three proposals are interdependent and are needed to provide through Mod Recommendation 206 and Resolution [CGC.Notify], an interim regulatory structure within the context of the Radio Regulations that will recognize CGC deployments and operations within Integrated MSS System networks until WRC-16 considers, through Resolution [CGC.Agenda], appropriate regulatory and operational modifications to the Radio Regulations to accommodate deployment and operation of CGC on a permanent basis.

The three Draft proposals are attached and are recommended for adoption by the FCC's WRC Advisory Committee as recommended draft U.S. proposals.

ATTACHMENT A

United States of America
DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 7: *To consider possible changes in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference: "advance publication, coordination, notification and recording procedures of the Radio Regulations for frequency assignments pertaining to space services,"[3] in accordance with Resolution 86 (Rev. WRC 07).*

Background: Integrated MSS Systems[4] employ technology that integrates mobile- satellite components and terrestrial components ("complementary ground component or 'CGC'") into a single system reusing MSS frequencies for both components. Currently, there are provisions in the Radio Regulations to accommodate satellite systems and terrestrial networks separately, but additional provisions are needed to accommodate the unique aspects of Integrated MSS Systems.
Resolution 86 resolves to invite future world radiocommunication conferences to:

1) to consider any proposals which deal with deficiencies and improvements in the advance publication, coordination, notification and recording procedures of the Radio Regulations for frequency assignments pertaining to space services which have been identified by administrations as appropriate, and 2) to ensure that these procedures and the related appendices of the Radio Regulations reflect the latest technologies as far as possible.[5]

Discussion: Currently, the Radio Regulations lack certain regulatory provisions for notifying and registering the complementary ground component ("CGC") of Integrated MSS Systems. Because the architectural and operational features of Integrated MSS Systems are such that the MSS component and terrestrial component are integrated within a single network, it is essential to recognize and give consideration to both elements of these networks. In the bands 1525-1544 MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.5- 1660.5 MHz , at least one MSS operator will roll out CGC deployments in 2011.
Consequently, it would be prudent to provide, at least on an interim basis as a minimum, procedures in the Radio Regulations to take account of CGC deployment in the bands 525-1544 MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.5-1660.5 MHz. Therefore, interim procedures are proposed in New Resolution [CGC.Notify] to provide a mechanism for notifying and registering CGC stations, and for submitting to the ITU BR and subsequently entering information for the notification of CGC stations and for associating CGC assignments with their operational MSS systems within the bands referenced above. Additionally, Resolution [CGC. Notify] instructs the ITU Radiocommunication Bureau on procedures for handling such CGC information submitted in accordance with interim procedures provided in Resolution [CGC.Notify]. Resolution [CGC.Notify] will supplement the current Article 9 and Article 11 procedures that are applicable to the satellite component of Integrated MSS Systems.

---

[3] Int'l Telecomm. Union [ITU], *Implementation of Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference*, at *resolves to invite future world radiocommunication conferences* ¶ 1, Resolution 86 (Rev. WRC-07) (2007).

[4] The ITU-R Coordination Committee for Vocabulary ("CCV") is considering the definition of Integrated MSS System given below. This is also the working definition used in ITU-R Working Parties 4C, 4B, and 4A. *See, SUMMARY RECORD OF THE CCV/1-10 MEETING OF THE COORDINATION COMMITTEE FOR VOCABULARY (CCV),* Document CCV/29, 22 March 2010 (Geneva).

[5] *Supra* note 1, *resolves to invite future world radiocommunication conferences* ¶¶ 1-2.

USA/ /02 ADD

Resolution [CGC.Notify] (WRC-2012)

Interim Procedures for Notification and Recording of the Complementary Ground Component of Integrated MSS Systems[6] in 1525-1544 MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.5-1660.5 MHz

The World Radiocommunication Conference (Geneva, 2012),

considering

a) that MSS systems can provide service over a wide geographic area and are particularly suited for emergency and disaster recovery communications and rural communications;

b) that MSS systems can have limited capacity for providing radio communications services in urban areas due to natural and/or man-made blockage;

c) that an MSS system with an integrated Complementary Ground Component (CGC) system will extend and improve the availability of radio communications services in areas where reliable current and next generation communications are not otherwise provided with one or more space stations or cannot otherwise be assured, and in this way increase spectrum efficiency in bands allocated to the mobile-satellite service;

d) that a number of administrations are implementing or planning to implement Integrated MSS Systems in parts of the bands identified for the satellite component of IMT in the bands 1525- 1559 MHz and 1626.5- 1660.5 MHz;

e) that in providing radiocommunication services, there is a need continually to exploit technological developments to increase the efficiency of use of finite radiocommunication spectrum resources as technology permits.

recognizing

a) that the bands 1525-1544 MHz, 1545-1559 MHz, 1626.5-1645.5 MHz and 1646.5-1660.5 MHz are allocated on a co-primary basis to the mobile-satellite service and to other services;

b) that Resolution **215 (Rev.WRC-97)** addresses the coordination process among mobile-satellite systems and the efficient use of the allocations to the mobile –satellite service in the 1- 3 GHz range;

c) that the distress, urgency and safety communications of the Global Maritime Distress and Safety System and the aeronautical mobile-satellite (R) service have priority access and immediate availability in specified bands over all other mobile-satellite service communications in accordance with Nos. 5.353A and 5.357A;

d) that the frequency bands referred to in *recognizing a)* are also used by other systems in the services to which the bands are allocated, and that these systems and services need to be protected from harmful interference;

e) that the deployment of the Complementary Ground Component is predicated upon the Complementary Ground Component being integrated with one or more space stations of an Integrated MSS System;

---

[6] An Integrated MSS System is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system. In such systems the ground component is controlled by the satellite resource and network management systems. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system.

f) that the Complementary Ground Component will use the same allocated and assigned frequency bands as the associated MSS system;

g) that the Complementary Ground Component will be located only within the service area of its associated MSS system and is to be controlled by the Integrated MSS System network management system;

noting

a) that, in general, co-frequency sharing and reuse of the spectrum by independently controlled mobile-satellite and terrestrial mobile systems is not feasible in the same geographic area;

b) that Integrated MSS Systems can avoid the spectrum-sharing compatibilities in *noting* 1);

c) that Article 11 provisions No 11.2 through 11.11 requires that " Any frequency assignment to a transmitter station and to its associated receiving station shall be notified to the Bureau";

d) that the coordination and notification procedures of Articles 9 and 11 apply to the MSS component of Integrated MSS Systems;

e) that currently Appendix 4 of the Radio Regulations does not contain provisions for associating notified Complementary Ground Component stations with MSS components of their Integrated MSS system;

f) that the mobile terminals (consisting of mobile earth stations and mobile stations in the same platform) of such Integrated MSS Systems are capable of communicating directly via multiple radio interfaces with the base stations of the Complementary Ground Component and the space stations of the associated mobile satellite system using the same common frequency bands;

resolves

1. that administrations choosing to associate CGC operations with Integrated MSS network frequency assignments shall apply the attached Annex to the Complementary Ground Component of Integrated MSS systems as described in the *recognizings.*

instructs the Radiocommunication Bureau

1. to implement the interim procedures of the attached Annex for base stations transmitting in the bands 1 525 - 1544 MHz, and 1 545 - 1 559 MHz, and mobile stations transmitting in the bands 1626.5 - 1645.5 MHz ,and 1646.5 - 1660.5 MHz that are integrated with MSS systems operating in the same frequency bands and in territories within the MSS system service area provided that coordination or notification information has been submitted for the associated MSS system in accordance with Article 9 or Article 11;

ANNEX

Interim Procedures for Notification and Recording of Complementary Ground Components of Integrated MSS Systems

Introduction

This Annex provides interim procedures for the submission of technical information to the ITU Radiocommunications Bureau (BR) for the Complementary Ground Components of Integrated MSS networks in the 1525-1544 MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.5 – 1660.5MHz bands. These interim procedures provide information that is to be submitted by the Notifying Administration of the Integrated MSS system and by Administrations implementing the Complementary Ground Component of the Integrated MSS system.

Interim Procedure

A) Administrations that are implementing a Complementary Ground Component of an Integrated MSS system shall submit the following information to the ITU-BR in accordance with these procedures: An Appendix 4 Annex 1 notice for stations of a Complementary Ground Component;

1. in the remarks of the Appendix 4 Annex 1 notice,

   a. indicate that the stations are Complementary Ground Components of an Integrated MSS System submitted in accordance with these procedures, and

   b. specify the associated MSS system and related ITU IFIC and Network Identifier.

B) The Notifying Administration for an MSS system of an Integrated MSS system shall submit an Appendix 4 Annex 2 notice and:

1. shall indicate in the submittal letter for the Appendix 4 Annex 2 notice that the MSS network is an Integrated MSS network;
2. shall provide a cross reference to the Appendix 4 Annex 1 filing which has the characteristics of stations of the Complementary Ground Component; and
3. shall confirm separately any Appendix 4 Annex 1 notice that is submitted by another Administration implementing a Complementary Ground Component that is associated with the Integrated MSS system.

C) Administrations notifying Integrated MSS systems shall include reference to the Appendix 4 Annex 1 notice of the associated Complementary Ground Component of an Integrated MSS system in the Article 11 notification.

The ITU Radiocommunications Bureau shall:

1. process complete notices for Complementary Ground Component base stations transmitting in the bands 1 525 - 1544 MHz, and 1 545 - 1 559 MHz, and mobile stations transmitting in the bands 1626.5 - 1645.5 MHz, and 1646.5 - 1660.5 MHz that are integrated with MSS systems operating in the same frequency bands and in territories within the MSS system service area provided that coordination or notification information has been submitted for the associated MSS system in accordance with Article 9 or Article 11;

2. where possible, include the reference to the Appendix 4, Annex 1 Complementary Ground Component notice with the publication of the Appendix 4 Annex 2 information for the MSS system of the Integrated MSS system;

3. record such CGC stations as integrated with MSS systems on the basis of:

a. a statement by an Administration submitting Complementary Ground Component notices in accordance with this interim procedure identifying the MSS system with which the Complementary Ground Component is integrated; and

b. a confirmation of the above statement by the Administration notifying the Integrated MSS System;

4. record such CGC station notices, in accordance with the Radio Regulations, as appropriate, together with the identification of the associated MSS system, concurrently with, or after assignments are recorded for the associated MSS system in the Integrated MSS System; and

5. if the MSS space station assignment is cancelled or suppressed, the Bureau shall review the earth station and CGC station(s) associated with the MSS space station and request the Notifying administration of the earth stations or the CGC stations to either cancel or suitably modify the basic characteristics of the entry.

Reason: *To provide interim notification and recording procedures for the Complementary Ground Component of Integrated MSS Systems by providing a Resolution [CGC.Notify] with interim procedures for filing notices of stations of the Complementary Ground Component of Integrated MSS Systems and to identify the relevant associated mobile satellite network for the Complementary Ground Component. The interim procedures provided in Resolution [CGC.Notify] include procedures for the ITU Radiocommunication Bureau for handling such CGC information submitted by its notifying administration. This Resolution [CGC.Notify] will supplement the current Article 9 and Article 11 procedures that are applicable to the satellite component of Integrated MSS Systems.*

ATTACHMENT B

United States of America
DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 4: *in accordance with Resolution 95 (Rev.WRC 07), to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;*
Background: Integrated MSS Systems[7] employ technology that integrates mobile-satellite components and terrestrial components ("complementary ground component or 'CGC'") into a single system reusing MSS frequencies for both components. Currently, there are provisions in the Radio Regulations to accommodate satellite systems and terrestrial networks separately, but additional provisions are needed to accommodate the unique aspects of Integrated MSS Systems.

Recommendation 206 (WRC-07) recognized that some administrations are implementing Integrated MSS Systems. This is, or will be, occurring on both a regional and global basis beginning as early as 2011. Recommendation 206 (WRC-07) invited the ITU-R to perform studies on sharing, technical and regulatory issues regarding these Integrated Systems. Since WRC-07, in accordance with Recommendation 206 (WRC-07), a number of studies related to Integrated MSS Systems have been initiated in ITU-R Working Parties 4B and 4C. Importantly, at least one Integrated MSS System authorized to operate in the bands 1525-1559 and 1626.5-1660.5 MHz will begin deployment of CGC networks in 2011.

Discussion: With the imminent deployment of full Integrated MSS Systems in the 1525-1559 and 1626.5-1660.5 MHz bands, and because specific provisions for the complementary ground component of an Integrated MSS System are needed in the current Radio Regulations,[8] it is imperative that on an interim basis as a minimum, provisions are adopted into the Radio Regulations at WRC-12 to provide regulatory guidance for the treatment of Integrated MSS Systems, pending the completion of ITU-R studies, and consideration of Integrated MSS System matters at the next WRC. This will provide regulatory certainty and guidance for administrations to permit CGC deployment in their territories. This will ease rollout of service as well as promote more efficient use of spectrum and will facilitate interference control and protection.

---

[7] The ITU-R Coordination Committee for Vocabulary ("CCV") is considering the definition of Integrated MSS System given below. This is also the working definition used in ITU-R Working Parties 4C, 4B, and 4A. *See, SUMMARY RECORD OF THE CCV/1-10 MEETING OF THE COORDINATION COMMITTEEFOR VOCABULARY (CCV),* Document CCV/29, 22 March 2010 (Geneva).

[8] Other organizations have recognized the lack of Radio Regulation provisions to cover the case of Integrated Systems. For example, in Europe, the CEPT Conference Preparatory Group Project Team A (CPG-PTA) has taken a preliminary position that the existing radio regulations need additional provisions for regulatory provisions for full deployment of MSS systems with CGC because of the absence of procedures for CGC notification, registration and coordination to facilitate the full deployment of MSS systems with CGC. (*See* Conference of European Postal and Telecommunications Administrations [CEPT], *Working Document Agenda Item 1.2,* at 11, CPG-PTA Temp 03.) Furthermore, the CPG-PTA indicates that the most appropriate option is to introduce a new definition for the service combining features of mobile service and mobile satellite service to enable the introduction of CGC, for example an "Integrated Satellite service." (*Id.* at 12.)

USA/ /01 MOD

RECOMMENDATION 206 (WRC-07)

~~Consideration on the possible~~ Uuse of lintegrated Mmobile-Ssatellite Sservice and ground component systems in some frequency bands identified for the satellite component of International Mobile Telecommunications

The World Radiocommunication Conference (Geneva, 201207),

considering

a) that mobile-satellite service (MSS) systems may provide service to a wide area;

b) that MSS systems can have a limited capacity for providing ~~reliable~~ radiocommunication services in urban areas due to~~on account of~~ natural or man-made obstacles and that the ground component of an integrated MSS system can mitigate blockage areas, as well as allow for indoor service coverage;

c) that MSS systems can improve coverage of rural areas, thus being one element that can bridge the digital divide in terms of geography;

d) that MSS systems are suitable for public protection and disaster relief communications, as stated in Resolution **646 (WRC-03)**;

e) that the bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz and 2 483.5-2 500 MHz are among those identified in Resolution **225 (Rev.WRC-07)** for administrations wishing to implement the satellite component of International Mobile Telecommunications (IMT);

f) that the bands mentioned in *considering e)* are allocated on a primary basis to the mobile-satellite services and other services and that not all of them are allocated to the mobile service;

g) that the bands 1 980-2 010 MHz and 2 170-2 200 MHz are identified for use by the satellite component of IMT-2000 in accordance with Resolution **212 (Rev.WRC-07)**;

h) that within their territories in some or parts of the bands identified in *considering e)* and *g)* and in parts of the band 2 010-2 025 MHz in some countries in Region 2, some administrations have authorized or plan to authorize MSS system operators to establish an integrated ground component to their MSS systems ("Integrated System") and under certain conditions determined at the national level such as:

i) the ground component is complementary to, and operates as an integral part, of the MSS system and, together with the satellite component, provides an integrated service offering;

ii) the ground component is controlled by the satellite resource and network management system;

iii) the ground component uses the same designated portions of the frequency band as the associated operational MSS system;

i) that ITU-R has performed frequency sharing studies and has determined that the coexistence between independent systems in the MSS and systems in the mobile services in the same spectrum without harmful interference is not feasible in the same or adjacent geographical area,

recognizing

a) that ITU-R has not performed studies on sharing, technical or regulatory issues with regard to integrated MSS and ground component systems, but that some administrations have performed such studies;

b) that the radionavigation-satellite service in the 1 559-1 610 MHz band and the radio astronomy service in the bands 1 610.6-1 613.8 MHz and 1 660-1 670 MHz need to be protected from harmful interference;

c) that the MSS needs to be protected from harmful interference that may be caused by the introduction of the ground component of Integrated Systems;

d) that Nos. **5.353A** and **5.357A** are applicable to MSS systems in different portions of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz with respect to the spectrum requirements and prioritization of communications for the Global Maritime Distress and Safety System and the aeronautical mobile-satellite (R) service,

noting

a) that the combined wide-area and urban coverage capabilities of Integrated MSS Systems may contribute to meeting the particular needs of developing countries such as is noted in Resolution **212 (Rev.WRC-07)**;

b) that some administrations that are planning to implement or are implementing Integrated MSS Systems within their national territories have imposed limitations, in rules and authorization actions, on the e.i.r.p. density that the ground component of such systems may produce into bands allocated to the radionavigation-satellite service;

c) that there are a limited number of frequency bands allocated to the MSS, that these bands are already congested, and that the introduction of integrated ground components may in some instances make spectrum access for other MSS systems more difficult;

d) that administrations implementing Integrated MSS Systems may provide, in bilateral or multilateral consultations among ~~of~~ administrations, information on system characteristics of the ground component,

recommends

1. to invite ITU-R to conduct studies, as appropriate, taking into account existing systems and those proposed to be used soon and the above *considering*, *recognizing* and *noting*,

2. to invite ITU-R to conduct compatibility studies between Integrated MSS Systems and other services operating in the bands 1525-1544MHZ, 1545-1559 MHz, 1626.5-1645.5 MHz and 1646.5- 1660.5 MHz with a view to completing studies in time for RA-15

3. that on an interim basis until WRC-1~~6~~5, in the bands 1525-1544MHz , 1545-1559 MHz, 1626.5-1645.5 MHz and 1646.6-1660.5 MHz, the mobile-satellite service as defined in No 1.25 includes Integrated MSS Systems defined as:

   a. An Integrated MSS System is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system, In such systems the ground component is controlled by the satellite resource and network management system. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system.

invites administrations

1. to participate as necessary in the ITU-R studies taking into account *recognizing a)*.

2. to include within MSS satellite coordinations, conducted pursuant to No 9.11A and No 5.354, CGC stations associated with relevant MSS networks in the 1525-1544 MHz, 1545-1559 MHz,1626.5-1645.5 MHz and 1646.5-1660.5 MHz bands.

Reason: Pending action at the next WRC to provide guidance on the treatment of complementary ground component of Integrated MSS Systems, to participate as necessary in the ITU-R studies taking into account *recognizing a)*; to invite studies specifically on CGC operations in 1525-1545 MHz, 1546-1559Mhz, 1626.5-1645.5 MHz, and 1646.5-1660.5 MHz and to urge administrations to include CGC stations in relevant MSS coordinations in these bands.

ATTACHMENT C

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 8.2: *to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 806 (WRC 07);*

Background: At WRC-07, one Administration proposed changes to Article 5 of the Radio Regulations, as well as associated consequential changes, to provide for Integrated MSS Systems.[9] At WRC-07, discussions on this matter led to WRC-07 adopting Recommendation 206 (WRC-07).

Recommendation 206 (WRC-07) recognized that some administrations were already implementing Integrated MSS Systems, and recommended that the ITU-R conduct studies on such systems, and also invited administrations to participate in these studies. Since WRC-07, in accordance with Recommendation 206 (WRC-07), a number of studies related to Integrated MSS Systems have been initiated in ITU-R Working Party 4C and Working Party 4B. These studies are progressing and should be completed well in advance of WRC-15.

Discussion: Currently, the Radio Regulations do not have regulatory and technical provisions to address the unique regulatory and operational aspects of the complementary ground component ("CGC") of an Integrated MSS Systems. The attached proposals address this situation.

Integrated MSS Systems intended to operate in the bands 1525-1559 MHz and 1626.5- 1660.5 MHz, will begin operations, including deploying CGC networks, in 2011. It is essential that at the first opportunity a World Radiocommunication Conference adopt provisions to recognize the CGC component in the bands 1525-1559 MHz and 1626.5 – 1660.5 MHz, as well as the conditions under which such systems shall be permitted. Further, because the CGC component will be authorized by individual administrations, it is imperative to provide guidance for the notification of CGC networks to the ITU-R, as well as to provide a harmonized framework for their global deployment. The attached proposals provide a WRC-15 agenda item to address these matters, as well as an associated Resolution.

---

[9] The ITU-R Coordination Committee for Vocabulary ("CCV") is considering the definition of Integrated MSS System given below. This is also the working definition used in ITU-R Working Parties 4C, 4B, and 4A. *See, SUMMARY RECORD OF THE CCV/1-10 MEETING OF THE COORDINATION COMMITTEEFOR VOCABULARY (CCV),* Document CCV/29, 22 March 2010 (Geneva). Within the ITU-R, the working definition for Integrated MSS Systems is:

> An integrated MSS system is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system. In such systems the ground component is controlled by the satellite resource and network management system. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system.

Proposals:

Agenda Item 8.2

RESOLUTION 806 (WRC-07)

Preliminary agenda for the 2015 World Radiocommunication Communication Conference

USA/ /01 **ADD**

- X.X to consider adopting regulatory, technical and allocation provisions in the Radio Regulations to enable the Complementary Ground Component ("CGC") of a mobile-satellite service (MSS) system to operate on a co- primary basis with the MSS allocation in the bands 1525-1544 MHz, 1545 -1559 MHz, 1626.5- 1645.5 MHz and 1646.5- 1660.5 MHz taking into account MOD Recommendation 206 (WRC-12) and Resolution [CGC.Agenda (WRC-12)] and the results of any compatibility and sharing studies with other radio services operating in these bands.

Reason: Integrated MSS Systems are deploying in the bands 1525-1544 MHz, 1545 -1559 MHz, 1626.5-1645.5 MHz and 1646.5- 1660.5 MHz in 2011. These deployments will be both regional and global. This agenda item will allow WRC -15 to adopt regulatory, technical and allocation provisions to enable the deployment of the complementary ground component with MSS systems.

USA/ /02 **ADD**

Resolution [CGC.Agenda] [(WRC-12)]

Consideration of Regulatory, Allocation and Technical Provisions of Integrated MSS Systems[10] in the Bands 1525-1544 MHz, 1545 -1559 MHz, 1626.5- 1645.5 MHz and 1646.5- 1660.5 MHz

The World Radiocommunication Conference (Geneva, 2012),

considering

a) that mobile-satellite service (MSS) systems may provide service to a wide area;

b) that MSS systems can have limited capacity for providing radiocommunication services in urban areas due to natural or man-made obstacles;

c) that a complementary ground component of an integrated MSS system can mitigate blockage areas, as well as allow for indoor service coverage;

c) that MSS systems can improve coverage of rural areas, thus being one element that can bridge the digital divide in terms of geographical coverage;

d) that MSS systems are suitable for public protection and disaster relief communications, as stated in Resolution **646 (WRC-03)**;

e) that an MSS system with an integrated Complementary Ground Component (CGC) system will extend and improve the availability of radiocommunications services in areas where reliable current and next generation communications are not otherwise provided with one or more space stations or cannot otherwise be assured, and in this way increase spectrum efficiency in bands allocated to the Mobile-Satellite service;

f) that the bands 1 525-1 544 MHz, 1 545-1 559 MHz, and 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz are allocated on a co primary basis to the mobile-satellite service and other services;

---

[10] An Integrated MSS System is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system. In such systems the ground component is controlled by the satellite resource and network management systems. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system.

g) that within their territories in the bands identified in *considering f)*, some administrations have authorized or plan to authorize MSS system operators to establish an integrated complementary ground component to their MSS systems ("Integrated MSS System");

h) that Integrated MSS Systems meet certain conditions such as:

i) the ground component is complementary to, and operates as an integral part, of the MSS system and, together with the satellite component, provides an integrated MSS service offering;

ii) the ground component is controlled by the satellite resource and network management system;

iii) the ground component reuses the MSS frequencies of the associated mobile-satellite system;

j) that ITU-R has performed frequency sharing studies and has determined that the coexistence between independent systems in the MSS and systems in the mobile services in the same spectrum without harmful interference is not feasible in the same or adjacent geographical area;

recognizing

a) that within the ITU-R, studies are underway regarding the compatibility of the CGC element of Integrated MSS Systems with other services in the bands 1525-1544 MHz,1545 -1559 MHz, 1626.5- 1645.5 MHz and 1646.5- 1660.5MHz;

b) that some administrations have already performed such studies;

c) that in the bands 1545-1555 MHz, 1646.5- 1656.5 MHz complementary terrestrial networks are already permitted for use in conjunction with AMS(R)S systems;

d) that in providing radiocommunication services there is continuing need to exploit technological developments to increase the efficiency of use of finite radiocommunication spectrum resources as technology permits;

e) that some administrations will deploy Integrated MSS Systems beginning in 2011.

noting

a) that the combined wide-area and urban coverage capabilities of Integrated MSS Systems may contribute to meeting the particular needs of developing countries such as is noted in Resolution 212 (Rev.WRC-07);

b) that the radionavigation-satellite service in the 1 559-1 610 MHz band and the radio astronomy service in the bands 1 610.6-1 613.8 MHz and 1 660-1 670 MHz need to be protected from harmful interference;

c) that there are a limited number of frequency bands allocated to the MSS, and that Integrated MSS systems can coexist with MSS systems without CGC;

d) that on an interim basis administrations implementing Integrated MSS Systems shall, in accordance with Resolution [CGC.Notify (WRC-12)], provide to the Radiocommunications Bureau, information on system characteristics of their CGC component.

Resolves

1. that in time for consideration at the World Radiocommunication Conference -15, the ITU-R should conclude compatibility studies regarding Integrated MSS Systems and other services operating in the bands 1525- 1544 MHz,1545-1559 MHz,1626.5- 1645.5MHz and 1646.5- 1660.5 MHz.

2. that in time for consideration at the WRC-15, the ITU-R should develop necessary regulatory mechanisms to enable coordination, notification and recording in the Master International Frequency Register of the CGC of a mobile-satellite network operating in the bands 1525- 1544 MHz,1545-1559 MHz,1626.5- 1645.5MHz and 1646.5- 1660.5 MHz

3 that WRC-15 is to consider adopting regulatory, technical and allocation provisions in the Radio Regulations to enable the Complementary Ground Component ("CGC") of a mobile satellite service system to operate on co primary basis with the mobile satellite service allocation in the bands 1525- 1544

MHz,1545-1559 MHz,1626.5- 1645.5MHz and 1646.5- 1660.5 MHz taking into account MOD Recommendation 206 (WRC-12), (WRC-12) and Resolution [CGC.Agenda (WRC-12)] and the results of any compatibility and sharing studies with other radio services operating in these bands.

4 that on an interim basis, and subject to confirmation by WRC-15, in the bands 1525-1544 MHz, 1545-1559 MHz, 1626.5-1645.5 MHz and 1646.5-1660.5 MHz the mobile-satellite service as defined in No 1.25 includes Integrated MSS Systems defined as:

> An Integrated MSS System is a system employing a satellite component and ground component where the ground component is complementary to the satellite component and operates as and is an integral part of the MSS system. In such systems the ground component is controlled by the satellite resource and network management system. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system. ;

invites ITU-R

1 to conduct in time for WRC-15 the necessary studies leading to technical, regulatory and operational recommendations to the Conference, enabling that Conference to decide on appropriate allocations for the operation of complementary ground component of Integrated MSS systems on a co primary basis with the mobile satellite service allocation,

2 that the studies referred to in *invites ITU-R* 1 should include sharing and compatibility studies with services already having allocations in the bands 1525- 1545MHz, 1545-1559 MHz, 1626.5- 1645.5 MHz and 1646.50 1660.5 MHz;

3 to produce a report or a recommendation, as appropriate, on how to accommodate Integrated MSS systems in the bands in invites ITU-R 2,

Reason: To provide for consideration by WRC-15 of new allocations and Radio Regulations to address Integrated MSS Systems and associated Complementary Ground Components which will begin deploying in 2011. .

ANNEX B

Inmarsat's Recommendation on LightSquared's Draft Proposals for WRC-12 on Integrated MSS Systems

Inmarsat's Recommendation on LightSquared's Draft Proposals for WRC-12 on Integrated MSS Systems

Inmarsat takes note of LightSquared's three proposals summarized in document IWG-4/074 (r1) for the IWG-4 for its next meeting on the following items:
1) Agenda Item 4 to modify Recommendation 206 into a Resolution [IMS 1.5/1.6 GHz (WRC-12)];

2) Agenda Item 7, to provide a Resolution [CGC.Notify]; and

3) Agenda Item 8.2 to propose a WRC-16 Agenda Item and an accompanying Resolution [CGC.Agenda (WRC-12)].

Inmarsat appreciates the intent of LightSquared's proposals. In fact, Inmarsat has cooperated with LightSquared to enable deployment of Ancillary Terrestrial Components, also known as Complementary Ground Component (ATC/CGC) base stations, including significant modifications to permit higher power operations to provide advanced mobile wireless services in North America. This process has worked well for both operators, notifying Administrations, and consumers. Inmarsat believes that the model that was used for coordination of ATC/CGC base stations in North America and other regions can serve as a framework for deployment of ATC/CGC in other regions as well.

Disadvantages of the LightSquared Proposals

In large part because the process followed in North America has worked so well, Inmarsat disagrees with the need for and desirability of proposing new ITU procedures for coordination and notification of ATC/CGC base stations. Inmarsat does not share the view that it is necessary to take the significant step of proposing to modify the ITU Radio Regulations (RRs) to accommodate ATC/CGC base stations. Inmarsat believes that the current RRs provide adequate flexibility to accommodate ATC/CGC base stations in the current ITU procedures.

Any ITU action would have to be preceded by detailed studies at the national and international levels to determine the conditions for ATC/CGC use. ITU studies would tend to be based on worst case assumptions and will delay the implementation of ATC/CGC in other countries and regions while they are pending. It is Inmarsat's belief that such studies are best carried out on a national and system specific basis to take into account actual conditions and concrete systems. Adding ITU studies to the process would create unnecessary duplication and require significant additional resources for all the necessary participants. In short, we 2

believe that it is preferable to have the introduction of ATC/CGC as an industry-driven process.

The proposed studies and implementation of additional procedures will also increase the administrative burden on the Radiocommunication Bureau (BR) as there could be many thousands of requests to notify terrestrial base stations, further taxing the BR's limited resources for processing satellite and other network filings.

Finally, as has been the case in the past, proposing and advocating for these proposed procedures nationally, regionally and at the upcoming World Radiocommunication Conference (WRC-12) will be contentious and will be enormously resource-intensive for the ITU, Administrations, and operators. Inmarsat, therefore, cannot support the proposals to include ATC/CGC into the ITU coordination process.

Alternative Path

Inmarsat believes that there is a better approach, based on the successful U.S. precedent, to achieving the goals that LightSquared is trying to obtain without the need to develop interim procedures or permanently modify the Radio Regulations and without the disadvantages of LightSquared's proposals identified above. Inmarsat submits the following alternative roadmap for consideration by the IWG-4 as a path forward for international deployment of ATC/CGC. This approach is intended to demonstrate that the goals that LightSquared is trying to achieve can be obtained more quickly and potentially result in greater flexibility with minimal impact on limited ITU and Administration resources.

There is a well-established international MSS coordination process covered by Article 9 of the RRs. It is Inmarsat's belief that that process can accommodate the goals that LightSquared is trying to achieve. Specifically, proponents of ATC/CGC networks should undertake a review of the current L-band coordination environment for each of the countries where ATC/CGC deployment is contemplated and conduct satellite coordination, if required. If satellite coordination is necessary and complete or well underway, the ATC/CGC proponents can commence discussions with other satellite operators to develop technical solutions to the coordination of ATC/CGC under existing ITU procedures.

Once agreements between the affected operators are in place, the MSS operator can approach regulators to endorse ATC/CGC operation. To facilitate this process, ATC/CGC proponents can educate regulators on already existing regulatory models in other countries, such as that in the United States. 1

The advantage of the above approach compared to pursuing Recommendations or Resolutions at WRC-12 is that it avoids the potential development of interference rules with unnecessarily conservative or restrictive requirements. Instead, it allows for maximum deployment/operational flexibility based on operator-to-operator agreements under the

1 *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-band, and the 1.6/2.4 GHz Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, Report and Order and Notice of Proposed Rulemaking*, FCC 03-15, 18 FCC Rcd 1962 (2003), modified by Order on Reconsideration, 18 FCC Rcd 13590 (2003), reconsidered in part in *Memorandum Opinion and Order and Second Order on Reconsideration*, FCC 05-30, 20 FCC Rcd 4616 (2005), further reconsideration pending. 3

auspices of notifying Administrations. In addition, the process proposed by Inmarsat would speed deployments by avoiding years of unnecessary study and save resources for the Bureau, Member States, Sector Members and operators.

Inmarsat believes that there is a valid role for regional and ITU organizations to play in facilitating the international deployment of ATC/CGC. For example, regional and ITU organizations could facilitate sharing of information papers on ATC/CGC deployment and hold forums and workshops on the benefits of ATC/CGC and regulatory best practices. Specifically, these fora could be valuable for detailing what ATC/CGC is and how it works, the potential benefits for spectrum efficiency, the potential public interest benefits (e.g., disaster recovery), and how ATC has been implemented from a regulatory and coordination perspective in other countries and regions. In addition, these fora could be a place for regulators to describe recommended procedures or best practices on how to coordinate ATC/CGC networks as part of MSS coordination procedures. We note that such an information paper was prepared prior to the last WRC, but much has happened since then and an update would be appropriate.

Conclusion

Inmarsat respectfully requests that the IWG-4 consider these factors in evaluating the necessity of proceeding with LightSquared's risky, complex and unnecessary approach to international deployment of ATC/CGC through modification of the ITU Radio Regulations.

Inmarsat also requests that this document be forwarded to the WRC Advisory Committee (WAC) if the IWG-4 decides to send LightSquared's proposals to the WAC without consensus.

DOCUMENT WAC/104(26.10.10)

UNITED STATES OF AMERICA

DRAFT PROPOSAL FOR WRC-12

AGENDA ITEM 7: to consider possible changes in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference: "Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks", in accordance with Resolution **86 (Rev.WRC-07)**

ISSUE: Coordination Arc Applicable to FSS Geostationary Satellite Networks in Certain Congested Portions of the 4/6 GHz and 10/11/12/14 GHz Frequency Bands

BACKGROUND: In certain portions of the 6/4 GHz band[1] as well as of the 10/11/12/14 GHz band[2], a new GSO FSS satellite network is likely required to effect coordination with a large number of other satellite networks with orbital separations in the range of 2° to 4° or even with less than 2° separation. The need to co-exist and ensure appropriate protection to all these satellite networks implies that coexistence with and protection of satellite networks with larger separation angles will automatically result and coordination with such networks is actually unnecessary.

One of the consequences of this situation is that many of the coordinations triggered by the current coordination arcs of 10° (6/4 GHz) and 9° (10/11/12/14 GHz) are never conducted because neither of the parties involved feels an actual need for it to be done. The burden of having to conduct coordination with satellite networks which are closer to the incoming network is already heavy enough to discourage operators and administrations to devote scarce resources to conduct coordination exercises that are clearly unnecessary.

Satellite networks in 6/4 GHz and 10/11/12/14 GHz

To assess the number of coordinations likely to be triggered in the 6/4 GHz band, a query to the ITU BR SNS database identified the satellite networks with frequency assignments in the range 3 700-4 200 MHz[3]. Satellite networks including this frequency range are found in 498 distinct orbital locations, some of them separated by only 0.1°. In most of these orbital locations there are multiple satellite networks, often filed by different administrations.

This means that the average orbital separation between neighbouring orbital locations with filings in the 3 700-4 200 MHz band is about 0.72°[4]. Moreover, within the current coordination arc of ±10° a new satellite network will on average have to coordinate with satellite networks at about 28 other orbital locations and many of these locations will include networks from multiple administrations.

Similarly, a query of the SNS for the band 14-14.5 GHz reveals that there are 527 distinct orbital locations with satellite networks with frequency assignments within this range[5]. This means that the average orbital separation between neighbouring orbital locations with filings in the 14-14.5 GHz band is about 0.68°[6].

---

1 3 400-4 200 MHz (space-to-Earth), 5 725-5 850 MHz (Earth-to-space) in Region 1, 5 850-6 725 MHz (Earth-to-space), 7 025-7 075 MHz (space-to-Earth) and (Earth-to-space).

2 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.5 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Regions 1 and 3, 12.7-12.75 GHz (Earth-to-space) in Region 2, and 13.75-14.5 GHz (Earth-to-space)

3 Query was conducted in early February 2010. The query included satellite networks with submitted advance publication information, with or without a coordination request or notification information submission.

4 Note that the average orbital separation between any two satellite networks is smaller than that because the separation of 0° between collocated satellite networks was not included in the computation of this average value.

5 See 3 above.

Therefore, within the current coordination arc of ±9° a new satellite network will on average have to coordinate with satellite networks at about 26 other orbital locations and many of these locations will include networks from multiple administrations.

In view of the assessment described above, it is concluded that the coordination arc of ±10° for satellite networks using the 6/4 GHz band is excessive. To assist in the evaluation of possible reduced values for the coordination arc, it is useful to assess the number of networks a satellite network would have to coordinate with, on average, if the coordination arc is reduced to alternative values. If the coordination arc is reduced to ±5° any new satellite network will on average still have to coordinate with satellite networks at 14 other orbital locations and coordination with satellite networks outside the 5° arc becomes unnecessary. Similarly, if the coordination arc is reduced to ±6° any new satellite network will on average still have to coordinate with satellite networks at 17 other orbital locations. Any constraints that may have to be imposed on the new comer in order to protect networks outside of these reduced arcs will already have been imposed by the significant number of networks within the arc.

Similarly, it is concluded from the above that the coordination arc of ±9° for satellite networks using the 10/11/12/14 GHz band is also excessive. Again, to assist in the evaluation of possible reduced values for the coordination arc, it is useful to assess the number of networks a satellite network would have to coordinate with, on average, if the coordination arc is reduced to alternative values. If the coordination arc is reduced to ±4° any new satellite network will on average still have to coordinate with satellite networks at 12 other orbital locations and coordination with satellite networks outside the 4° arc becomes unnecessary. Similarly, if the coordination arc is reduced to ±5° any new satellite network will on average still have to coordinate with satellite networks at 15 other orbital locations. Again, protection of the satellite networks within these reduced arcs of the new satellite network ensure that satellite networks outside the arc will also be protected.

Although the reasoning above was based on average values, a closer look at the distribution of satellite networks along the geostationary orbit reveals that the values of the orbital interval between adjacent satellite networks are limited to a small range. Actually, both for 6/4 GHz and 10/11/12/14 GHz, more than 90% of these orbital intervals do not exceed 1°. This means that adoption of the ±5° arc for satellite networks using the 6/4 GHz or of the ±4° arc for satellite networks using the 10/11/12/14 GHz band will still require that any new satellite network coordinate with several other satellite networks.

For satellite networks using the band 3 700-4 200 MHz the distribution of orbital spacing between adjacent orbital locations is shown in Table 1. It is concluded from Table 1 that almost 59% of these orbital intervals are 0.5° or less and more than 90% of the intervals are 1° or less.

The maximum orbital spacing is 4° which occurs only once, between 150°W and 154°W. Even in this extreme situation, a hypothetical satellite network at 152°W would have to coordinate with satellite networks from five different administrations with satellite networks at 147.6°W, 148°W, 150°W, 154°W, 155°W and 156°W. Coordination constraints imposed on the new satellite network by satellite networks at these six orbital locations would provide adequate protection to satellite networks outside the smallest of the coordination arcs considered above, ±5°.

---

6 See 4 above.

TABLE 1

Distribution of the orbital separation (δ) between adjacent orbital locations with satellite networks[7] including the frequency range 3 700-4 200 MHz

Orbital Separation (δ)	Number of Occurrences	Percentage (%)
$0< \delta<0.5$	124	24.91
0.5	169	33.94
$0.5< \delta<1.0$	36	7.23
1.0	121	24.30
$1.0< \delta<1.5$	6	1.20
1.5	6	1.20
$1.5< \delta<2.0$	3	0.60
2.0	27	5.42
2.5	4	0.80
3.0	1	0.20
4.0	1	0.20
Total Number of Intervals	498	100

For satellite networks using the band 14-14.5 GHz the distribution of orbital spacing between adjacent orbital locations is shown in Table 2. It is concluded from Table 2 that about 59% of these orbital intervals are 0.5° or less and more than 92% of the intervals are 1° or less.

The maximum orbital spacing is 3° which occurs only once, between 140°W and 143°W. Even in this extreme situation, a hypothetical satellite network at 141.5°W would have to coordinate with satellite networks from six different administrations with satellite networks at 138°W, 139°W, 140°W, 143°W and 144°W. Coordination constraints imposed on the new satellite network by satellite networks at these five orbital locations would provide adequate protection to satellite networks outside the smallest of the coordination arcs considered above, ±4°.

The distributions in Tables 1 and 2 are quite similar as many satellite networks include both the 6/4 GHz and the 10/11/12/14 GHz frequency ranges. For both distributions the mode is the interval of 0.5° while intervals of 1° and the aggregate of those of less than 0.5° have about the same frequency of occurrence.

TABLE 2

Distribution of the orbital separation (δ) between adjacent orbital locations with satellite networks[8] including the frequency range 14-14.5 GHz

Orbital separation (δ)	Number of occurrences	Percentage (%)
$0< \delta<0.5$	136	25.81
0.5	177	33.59
$0.5< \delta<1.0$	44	8.35
1.0	131	24.86
$1.0< \delta<1.5$	5	0.95
1.5	5	0.95
$1.5< \delta<2.0$	2	0.34
2.0	25	4.74

7 Satellite networks referenced here include those with submitted advance publication information, with or without a coordination request or notification information submission.

8 Satellite networks referenced here include advance publication information and coordination requests.

2.5	1	0.19
3.0	1	0.19
Total Number of Intervals	527	100

Satellites Currently in Orbit Using Frequencies in 6/4 GHz and 10/11/12/14 GHz

In order to further corroborate the above assessment that is based on satellite networks filed with the ITU, a similar assessment based on satellites currently in orbit was conducted. This assessment concluded that that the number of geostationary satellites currently in orbit which utilize the frequencies 3 700-4 200 MHz is 168. Table 3 shows the distribution of the orbital separation between satellites currently in orbit using the band 3 700-4 200 MHz.

It can be concluded that the average orbital separation between two satellites currently in orbit using the frequencies 3 700-4 200 MHz is about 2.16°. Based on the number of filed satellite networks, as discussed above, it was concluded that, for a 5° coordination arc, on the average a newly filed network would have to coordinate with satellite networks in 14 other orbital locations. It is now concluded that the average number of satellites currently in orbit involved in these coordinations would be approximately 4.6. For a possible coordination arc of 6°, the average number of satellites involved in the coordination increases to 6.

It has been noted that the distribution of satellites currently in orbit is significantly non-uniform over the 360° geostationary arc. In the arc 139 °W to 180 °E the average orbital separation becomes about 1.92°[9] while there are only two satellites in the interval (139 °W-180 °W). The largest arc without a satellite using the frequencies 3 700-4 200 MHz extends from 139 °W to 167 °W. Therefore, for a 5° coordination arc a hypothetical filing at, for instance, 153 °W would have to coordinate with several satellite networks but at the moment none of these networks would be associated with a satellite already in orbit. Although reducing the coordination arc from 10° to 5° would lead to more occurrences of such a situation, it is also true that not having to coordinate with a network associated with a satellite in orbit would currently occur for any filing between 149 °W and 157 °W[10].

TABLE 3

Distribution of the orbital separation (δ) between adjacent satellites that include the frequency range 3 700-4 200 MHz (coverage overlapping was not taken into account; frequency overlapping may be total or partial)

Orbital separation (δ°)	Number of occurrences	Percentage (%)
$0 \leq \delta \leq 0.5$	32	19.16
$0.5 < \delta \leq 1.0$	19	11.38
$1.0 < \delta \leq 1.5$	15	8.98
$1.5 < \delta \leq 2.0$	43	25.75
$2.0 < \delta \leq 3.0$	35	20.96
$3.0 < \delta \leq 4.0$	13	7.78
$4.0 < \delta \leq 5.0$	3	1.80
$\Delta > 5.0$	7	4.19
Total number of intervals	167	100

9 In the arc 139° W to 180° E a new filing would have to coordinate with networks that on average would be associated with approximately 5.2 satellites currently in orbit involved.

10 These assertions are being made discarding the possibility that a satellite network outside the coordination arc could request to be included in the coordination based on the $\Delta T/T$ criterion.

Similarly, an assessment of geostationary satellites currently in orbit which utilize the frequencies 14.0-14.5 GHz led to a total of 194 satellites. Table 4 shows the distribution of the orbital separation between satellites currently in orbit using the band 14.0-14.5 GHz.

It can be concluded that the average orbital separation between two satellites currently in orbit using the frequencies 14.0-14.5 GHz is about 1.87°. Based on the number of filed satellite networks, as discussed above, it was concluded that, for a 4° coordination arc, on the average a newly filed network would have to coordinate with satellite networks in 12 other orbital locations. It is now concluded that the average number of satellites currently in orbit involved in these coordinations would be approximately 4.3. For a possible coordination arc of 5°, the average number of satellites involved in the coordination increases to 5.3.

It has been noted that the distribution of satellites currently in orbit is significantly non-uniform over the 360° geostationary arc. In the arc 129 °W to 180 °E the average orbital separation becomes about 1.62° while there are only two satellites in the interval (139 °W-180 °W). The largest arc without a satellite using the frequencies 14.0-14.5 GHz extends from 129 °W to 167 °W. Therefore, for a 4° coordination arc a hypothetical filing at, for instance, 148° W would have to coordinate with several satellite networks but at the moment none of these networks would be associated with a satellite already in orbit. Although reducing the coordination arc from 9° to 4° would lead to more occurrences of such a situation, it is also true that not having to coordinate with a network associated with a satellite in orbit would currently occur for any filing between 138 °W and 158 °W[11].

TABLE 4

Distribution of the orbital separation (δ) between adjacent satellites that include the frequency range 14.0-14.5 GHz (coverage overlapping was not taken into account; frequency overlapping may be total or partial)

Orbital separation (δ°)	Number of occurrences	Percentage (%)
$0 \leq \delta \leq 0.5$	52	26.94
$0.5 < \delta \leq 1.0$	16	8.29
$1.0 < \delta \leq 1.5$	19	9.84
$1.5 < \delta \leq 2.0$	49	25.39
$2.0 < \delta \leq 3.0$	39	20.20
$3.0 < \delta \leq 4.0$	14	7.25
$4.0 < \delta \leq 5.0$	1	0.52
$\delta > 5.0$	3	1.55
Total number of intervals	193	100

Finally, it is noted that a reduction in the size of the coordination arc will eliminate coordination requirements that are often either not fulfilled[12] or carried out as a mere formality. Even with reduced coordination arcs, satellite networks in 6/4 GHz or in the 10/11/12/14 GHz which are outside the applicable arcs are already significantly constrained by other closer by satellite networks. Therefore, coordination between satellite networks that are far apart will either confirm the constraints imposed by closer networks or will lead to lighter constraints that are not applicable as they will be overcome by the former constraints.

---

11 These assertions are being made discarding the possibility that a satellite network outside the coordination arc request to be included in the coordination based on the $\Delta T/T$ criterion.

12 Recording is possible through the application of RR No.**11.32A** or No.**11.41**.

Taking into account the above analyses, it is proposed that a slightly more conservative approach be taken. Accordingly, it is proposed here that coordination arcs of 6° for satellite networks in 6/4 GHz and 5° for satellite net 10/11/12/14 GHz be adopted.

PROPOSAL:

MOD USA/7/1

Annex 1
TABLE 5-1 (WRC-07)
Technical conditions for coordination
(see Article **9**)

Reference of Article 9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **9.7** GSO/GSO	A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radio-communication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission	1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz 2) 10.95-11.2 GHz 11.45-11.7 GHz 11.7-12.2 GHz (Region 2) 12.2-12.5 GHz (Region 3) 12.5-12.75 GHz (Regions 1 and 3) 12.7-12.75 GHz (Region 2) and 13.75-14.5 GHz	i) Bandwidth overlap, and ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±~~10~~6° of the nominal orbital position of a proposed network in the FSS i) Bandwidth overlap, and ii) any network in the FSS or broadcasting-satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±~~9~~5° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan		With respect to the space services listed in the threshold/condition column in the bands in 1), 2), 3), 4), 5), 6), 7) and 8), an administration may request, pursuant to No. **9.41**, to be included in requests for coordination, indicating the networks for which the value of $\Delta T/T$ calculated by the method in § 2.2.1.2 and 3.2 of Appendix **8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. **9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **8** shall be used

Reasons: In view of the discussion in the Background Section, the United States proposes that the coordination arc applicable to FSS geostationary satellite networks in certain congested portions of the 4/6 GHz and 10/11/12/14 GHz frequency bands be reduced from 10° to 6° in 4/6 GHz and from 9° to 5° in 10/11/12/14 GHz.

DOCUMENT WAC/105(26.10.10)

UNITED STATES OF AMERICA
DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.2: *taking into account the ITU-R studies carried out in accordance with Resolution **951 (Rev. WRC-07)**, to take appropriate action with a view to enhancing the international regulatory framework*

Background Information: The subject matter considered under Agenda item 1.2 was first addressed at WRC-07 as agenda item 7.1, at the request of WRC-03. The agenda item asked WRC-07 to review the international spectrum regulatory framework in accordance with Resolution **951 (WRC-03)**, "Options to improve the international spectrum regulatory framework." The Director's Report to WRC-07 included the results of the ITU-R studies in response to Resolution **951 (WRC-03)**. WRC-07 concluded that further study on this topic was necessary and Agenda Item 1.2 for WRC-12 was adopted.

Under this Agenda Item extensive studies were undertaken, however to date there has been no consensus regarding the regulatory options investigated. To a large extent the attempt to develop broad regulatory changes that would apply across a significant portion of the Radio Regulations has been difficult. The impact of the proposed broad changes can not readily be quantified and therefore impact on other radiocommunication services is difficult to determine. For example, changes to the basic definitions or type of parameters that can be notified for the fixed service could have serious ramifications for sharing with other co-frequency radiocommunication services. This is particularly true for the fixed-satellite service as a number of frequency bands are shared between the fixed and fixed-satellite services.

One of the Options studied is to keep the current practice, where the mechanism to enhance the Radio Regulations would be undertaken under specific agenda items adopted at the previous WRC based on proposals made by Administrations. This mechanism is well known, established and has generally resulted in satisfying requirements of Administrations. Another Option considered was to modify or propose new definitions in Article 1 of the Radio Regulations.

In order to take advantage of the results of the studies undertaken in the ITU-R under Agenda Item 1.2, the U.S. proposes a modification of Recommendation 34. The modifications to the Recommendation provide guidance to ITU-R participants when undertaking studies under WRC agenda items or under their on-going studies when developing ITU-R Recommendations or Reports. The modification to Recommendation 34 supports allocations with appropriate footnote and regulatory provisions in order to accommodate convergence in the services and applications that might be provided within an allocation to the extent practicable and provide Administrations flexibility in the types of radiocommunication services and applications deployed in their countries and globally through harmonizing spectrum to the extent practicable. The revision also recognizes that provisional and interim procedures have been adopted by previous WRCs in order to implement emerging technologies in a timely fashion. The Resolution also provides a long term framework for the establishment of future allocations with associated footnotes and regulatory provisions to address multiple radio services and applications that might be permitted with an allocation.